OM-220 979B

February 2005

Processes

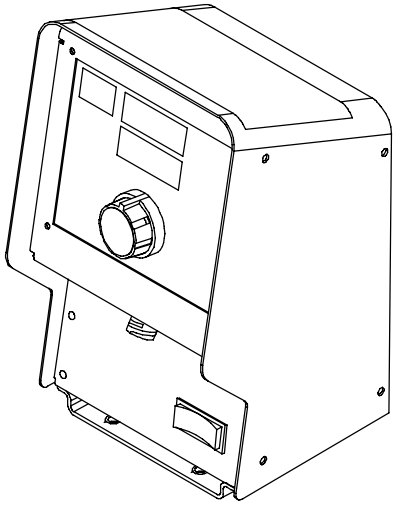
MIG (GMAW) Welding

Description

Wire Feeder

ROI

(Remote Operator Interface)



OWNER'S MANUAL

Visit our website at

www.MillerWelds.com

From Miller to You

Thank you and *congratulations* on choosing Miller. Now you can get the job done and get it done right. We know you don't have time to do it any other way.

That's why when Niels Miller first started building arc welders in 1929, he made sure his products offered long-lasting value and superior quality. Like you, his customers couldn't afford anything less. Miller products had to be more than the best they could be. They had to be the best you could buy.

Today, the people that build and sell Miller products continue the tradition. They're just as committed to providing equipment and service that meets the high standards of quality and value established in 1929.

This Owner's Manual is designed to help you get the most out of your Miller products. Please take time to read the Safety precautions. They will help you protect yourself against potential hazards on the worksite.

ISO 9001:2000 REGISTERED QUALITY SYSTEM

Miller is the first welding equipment manufacturer in the U.S.A. to be registered to the ISO 9001:2000 Quality System Standard.

We've made installation and operation quick and easy. With Miller you can count on years of reliable service with proper maintenance. And if for some reason the unit needs repair, there's a Troubleshooting section that will help you figure out what the problem is. The parts list will then help you to decide the exact part you may need to fix the problem. Warranty and service information for your particular model are also provided.

Miller Electric manufactures a full line of welders and welding related equipment. For information on other quality Miller products, contact your local Miller distributor to receive the latest full line catalog or individual catalog sheets. **To locate your nearest distributor or service agency call 1-800-4-A-Miller, or visit us at www.MillerWelds.com on the web.**

TRUE BLUE® WARRANTY

Working as hard as you do – every power source from Miller is backed by the most hassle-free warranty in the business.

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WARRANTY

Declaration of Conformity for European Community (CE) Products

Note ☞ *This information is provided for units with CE certification (see rating label on unit).*

Manufacturer's Name: Miller Electric Mfg. Co.

Manufacturer's Address: 1635 W. Spencer Street
Appleton, WI 54914 USA

Declares that the product: **ROI (Remote Operator Interface)**

conforms to the following Directives and Standards:

Directives

Low Voltage Directive: 73/23/EEC

Electromagnetic Compatibility (EMC) Directive: 89/336/EEC

Machinery Directives: 98/37/EEC, 91/368/EEC, 92/31/EEC, 133/04, 93/68/EEC

Standards

Arc Welding Equipment – Part 5: Wire Feeders. IEC 60974-5 Ed. 1

Arc Welding Equipment – Part 10: Electromagnetic Compatibility (EMC) Requirements. IEC 60974-10 August 2002

Arc Welding Equipment – Part 1: Welding Power Sources. IEC 60974-1 Ed. 2.1

Degrees Of Protection Provided By Enclosure (IP Code) IEC 60529 Ed. 2.1

Insulation Coordination For Equipment Within Low-Voltage Systems –
Part 1: Principles, Requirements and Tests: IEC 60664-1 Ed. 1.1

Additional Standards

Arc Welding Equipment – Part 2: Liquid Cooling Systems. IEC 60974-2 Ed. 1

Arc Welding Equipment – Part 3: Arc Striking And Stabilizing Devices. IEC 60974-3 Ed. 1

Arc Welding Equipment – Part 5: Wire Feeders. IEC 60974-5 Ed. 1

Arc Welding Equipment – Part 7: Torches. IC 60974-7 Ed.1

European Contact: Mr. Danilo Fedolfi, Managing Director
ITW WELDING PRODUCTS ITALY S.r.l.
Via Privata Iseo 6/E
20098 San Giuliano
Milanese, Italy

Telephone: 39(02)98290-1
Fax: 39(02)98290-203

SECTION 1 – SAFETY PRECAUTIONS - READ BEFORE USING

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1-1. Symbol Usage

Means Warning! Watch Out! There are possible hazards with this procedure! The possible hazards are shown in the adjoining symbols.

▲ **Marks a special safety message.**

☞ *Means "Note"; not safety related.*

This group of symbols means Warning! Watch Out! possible ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

1-2. Arc Welding Hazards

▲ **The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-5. Read and follow all Safety Standards.**

▲ **Only qualified persons should install, operate, maintain, and repair this unit.**

▲ **During operation, keep everybody, especially children, away.**

ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling.
- Use AC output ONLY if required for the welding process.
- If AC output is required, use remote output control if present on unit.
- Disconnect input power or stop engine before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
- Always verify the supply ground – check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- When making input connections, attach proper grounding conductor first – double-check connections.
- Frequently inspect input power cord for damage or bare wiring – replace cord immediately if damaged – bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or poorly spliced cables.
- Do not drape cables over your body.
- If earth grounding of the workpiece is required, ground it directly with a separate cable.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Do not connect more than one electrode or work cable to any single weld output terminal.

SIGNIFICANT DC VOLTAGE exists after removal of input power on inverters.

- Turn Off inverter, disconnect input power, and discharge input capacitors according to instructions in Maintenance Section before touching any parts.

FUMES AND GASES can be hazardous.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
- If ventilation is poor, use an approved air-supplied respirator.
- Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, consumables, coatings, cleaners, and degreasers.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watch-person nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

ARC RAYS can burn eyes and skin.

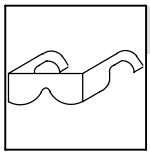
Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

- Wear a welding helmet fitted with a proper shade of filter to protect your face and eyes when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
- Wear protective clothing made from durable, flame-resistant material (leather and wool) and foot protection.

WELDING can cause fire or explosion.

Welding on closed containers, such as tanks, drums, or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding.

- Protect yourself and others from flying sparks and hot metal.
- Do not weld where flying sparks can strike flammable material.
- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not weld on closed containers such as tanks, drums, or pipes, unless they are properly prepared according to AWS F4.1 (see Safety Standards).
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.



FLYING METAL can injure eyes.

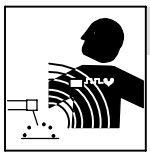
- Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag.
- Wear approved safety glasses with side shields even under your welding helmet.

BUILDUP OF GAS can injure or kill.

- Shut off shielding gas supply when not in use.
- Always ventilate confined spaces or use approved air-supplied respirator.

HOT PARTS can cause severe burns.

- Do not touch hot parts bare handed.
- Allow cooling period before working on gun or torch.



MAGNETIC FIELDS can affect pacemakers.

- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.

NOISE can damage hearing.

Noise from some processes or equipment can damage hearing.

- Wear approved ear protection if noise level is high.

CYLINDERS can explode if damaged.

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, slag, open flames, sparks, and arcs.
- Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding or other electrical circuits.
- Never drape a welding torch over a gas cylinder.
- Never allow a welding electrode to touch any cylinder.
- Never weld on a pressurized cylinder – explosion will result.
- Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.

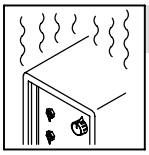
1-3. Additional Symbols For Installation, Operation, And Maintenance

FIRE OR EXPLOSION hazard.

- Do not install or place unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring – be sure power supply system is properly sized, rated, and protected to handle this unit.

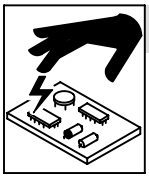
FALLING UNIT can cause injury.

- Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- Use equipment of adequate capacity to lift and support unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.



OVERUSE can cause OVERHEATING

- Allow cooling period; follow rated duty cycle.
- Reduce current or reduce duty cycle before starting to weld again.
- Do not block or filter airflow to unit.



STATIC (ESD) can damage PC boards.

- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.

MOVING PARTS can cause injury.

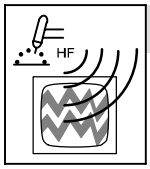
- Keep away from moving parts.
- Keep away from pinch points such as drive rolls.

WELDING WIRE can cause injury.

- Do not press gun trigger until instructed to do so.
- Do not point gun toward any part of the body, other people, or any metal when threading welding wire.

MOVING PARTS can cause injury.

- Keep away from moving parts such as fans.
- Keep all doors, panels, covers, and guards closed and securely in place.



H.F. RADIATION can cause interference.

- High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.

ARC WELDING can cause interference.

- Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots.
- Be sure all equipment in the welding area is electromagnetically compatible.
- To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.
- Locate welding operation 100 meters from any sensitive electronic equipment.
- Be sure this welding machine is installed and grounded according to this manual.
- If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

1-4. California Proposition 65 Warnings

▲ **Welding or cutting equipment produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)**

▲ **Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.**

For Gasoline Engines:

▲ **Engine exhaust contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.**

For Diesel Engines:

▲ **Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.**

1-5. Principal Safety Standards

Safety in Welding, Cutting, and Allied Processes, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami FL 33126 (phone: 305-443-9353, website: www.aws.org).

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126 (phone: 305-443-9353, website: www.aws.org).

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269–9101 (phone: 617–770–3000, website: www.nfpa.org and www.sparky.org).

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1735 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202–4102 (phone: 703–412–0900, website: www.cganet.com).

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3 (phone: 800–463–6727 or in Toronto 416–747–4044, website: www.csa–international.org).

Practice For Occupational And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 11 West 42nd Street, New York, NY 10036–8002 (phone: 212–642–4900, website: www.ansi.org).

Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, NFPA Standard 51B, from National Fire Protection Association, P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269–9101 (phone: 617–770–3000,website: www.nfpa.org and www. sparky.org).

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, from U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250 (there are 10 Regional Offices––phone for Region 5, Chicago, is 312–353–2220,website: www.osha.gov).

1-6. EMF Information

Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic Fields

Welding current, as it flows through welding cables, will cause electromagnetic fields. There has been and still is some concern about such fields. However, after examining more than 500 studies spanning 17 years of research, a special blue ribbon committee of the National Research Council concluded that: “The body of evidence, in the committee’s judgment, has not demonstrated that exposure to power-frequency electric and magnetic fields is a human-health hazard.” However, studies are still going forth and evidence continues to be examined. Until the final conclusions of the research are reached, you may wish to minimize your exposure to electromagnetic fields when welding or cutting.

To reduce magnetic fields in the workplace, use the following procedures:

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep welding power source and cables as far away from operator as practical.
5. Connect work clamp to workpiece as close to the weld as possible.

About Pacemakers:

Pacemaker wearers consult your doctor first. If cleared by your doctor, then following the above procedures is recommended.

SECTION 2 – CONSIGNES DE SÉCURITÉ – À LIRE AVANT UTILISATION

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2-1. Signification des symboles

Signifie « Mise en garde. Faire preuve de vigilance. » Cette procédure présente des risques identifiés par les symboles adjacents aux directives.

▲ **Identifie un message de sécurité particulier.**

☞ *Signifie « NOTA » ; n'est pas relatif à la sécurité.*

Ce groupe de symboles signifie « Mise en garde. Faire preuve de vigilance. » Il y a des dangers liés aux CHOCS ÉLECTRIQUES, aux PIÈCES EN MOUVEMENT et aux PIÈCES CHAUDES. Se reporter aux symboles et aux directives ci-dessous afin de connaître les mesures à prendre pour éviter tout danger.

2-2. Dangers relatifs au soudage à l'arc

▲ **Les symboles ci-après sont utilisés tout au long du présent manuel pour attirer l'attention sur les dangers potentiels et les identifier. Lorsqu'on voit un symbole, faire preuve de vigilance et suivre les directives mentionnées afin d'éviter tout danger. Les consignes de sécurité énoncées ci-après ne font que résumer le contenu des normes de sécurité mentionnées à la section 2-4. Lire et respecter toutes ces normes.**

▲ **L'installation, l'utilisation, l'entretien et les réparations ne doivent être confiés qu'à des personnes qualifiées.**

▲ **Pendant l'utilisation de l'appareil, tenir à l'écart toute personne, en particulier les enfants.**

LES DÉCHARGES ÉLECTRIQUES peuvent être mortelles.

Un simple contact avec des pièces sous tension peut causer une électrocution ou des blessures graves. L'électrode et le circuit de soudage sont sous tension dès que l'appareil est en fonctionnement. Le circuit d'entrée et les circuits internes de l'appareil sont également sous tension. En soudage semi–automatique ou automatique, le fil, le dévidoir, le logement des galets d'entraînement et les pièces métalliques en contact avec le fil de soudage sont sous tension. Tout matériel mal installé ou mal mis à la terre présente un danger.

- Ne jamais toucher aux pièces électriques sous tension.
- Porter des gants et des vêtements de protection secs et exempts de trous.
- S'isoler de la pièce et de la terre au moyen de tapis ou autres dispositifs isolants suffisamment grands pour empêcher tout contact physique avec la pièce ou la terre.
- Ne pas se servir d'une source de courant alternatif dans les zones humides, les endroits confinés ou là où on risque de tomber.
- Ne se servir d'une source de courant alternatif QUE si le procédé de soudage l'exige.
- Si l'utilisation d'une source de courant alternatif s'avère nécessaire, se servir de la fonction de télécommande si l'appareil en est équipé.
- Couper l'alimentation ou arrêter le moteur avant de procéder à l'installation, à la réparation ou à l'entretien de l'appareil. Couper/étiqueter l'alimentation selon la norme OSHA 29 CFR 1910.147 (voir les normes de sécurité).
- Installer et mettre à la terre correctement l'appareil conformément à son manuel d'utilisation et aux codes nationaux, provinciaux et municipaux.
- Toujours vérifier la terre du cordon d'alimentation – Vérifier et s'assurer que le fil de terre du cordon d'alimentation est bien raccordé à la borne de terre du sectionneur ou que la fiche du cordon est raccordée à une prise correctement mise à la terre.
- Pour exécuter les branchements d'entrée, fixer d'abord le conducteur de mise à la terre adéquat et contre–vérifier les connexions.
- Vérifier fréquemment le cordon d'alimentation et s'assurer qu'il n'est ni endommagé ni dénudé ; le remplacer immédiatement s'il est endommagé – tout câble dénudé peut causer une électrocution.
- Mettre l'appareil hors tension quand on ne l'utilise pas.
- Ne pas utiliser de câbles usés, endommagés, de calibre insuffisant ou mal épissés.
- Ne pas s'enrouler les câbles autour du corps.
- Si la pièce soudée doit être mise à la terre, le faire directement avec un câble distinct.
- Ne pas toucher l'électrode quand on est en contact avec la pièce, la terre ou une électrode d'une autre machine.
- N'utiliser que du matériel en bon état. Réparer ou remplacer sur–le–champ les pièces endommagées. Entretenir l'appareil conformément au présent manuel.
- Porter un harnais de sécurité quand on travaille en hauteur.
- Maintenir solidement en place tous les panneaux et capots.
- Fixer le câble de retour de façon à obtenir un bon contact métal sur métal avec la pièce à souder ou la table de travail, le plus près possible de la soudure.
- Ne pas connecter plus d'une électrode ou plus d'un câble de masse à un même terminal de sortie.

Il subsiste un COURANT CONTINU IMPORTANT dans les convertisseurs après la suppression de l'alimentation électrique.

- Arrêter les convertisseurs, débrancher le courant électrique et décharger les condensateurs d'alimentation selon les instructions énoncées à la section Entretien avant de toucher les pièces.

LES FUMÉES ET LES GAZ peuvent être dangereux.

Le soudage génère des fumées et des gaz dont l'inhalation peut être dangereuse pour la santé.

- Se tenir à distance des fumées et ne pas les inhaler.
- À l'intérieur, ventiler la zone et/ou utiliser un dispositif d'aspiration au niveau de l'arc pour l'évacuation des fumées et des gaz de soudage.
- Si la ventilation est insuffisante, utiliser un respirateur à adduction d'air agréé.
- Lire les fiches techniques de santé–sécurité (FTSS) et les instructions du fabricant concernant les métaux, les consommables, les revêtements, les nettoyants et les dégraisseurs.
- Ne travailler dans un espace clos que s'il est bien ventilé ou porter un respirateur à adduction d'air. Demander toujours à un surveillant dûment formé de se tenir à proximité. Des fumées et des gaz de soudage peuvent se substituer à l'air, abaisser la teneur en oxygène et causer des lésions ou des accidents mortels. S'assurer que l'air est respirable.
- Ne pas souder à proximité d'opérations de dégraissage, de nettoyage ou de pulvérisation. La chaleur et les rayons de l'arc peuvent réagir en présence de vapeurs et former des gaz hautement toxiques et irritants.
- Ne pas souder de métaux munis d'un revêtement, tels que la tôle d'acier galvanisée, plombée ou cadmiée, à moins que le revêtement n'ait été enlevé dans la zone de soudage, que l'endroit soit bien ventilé, et si nécessaire, porter un respirateur à adduction d'air. Les revêtements et tous les métaux renfermant ces éléments peuvent dégager des fumées toxiques lorsqu'on les soude.

LES RAYONS DE L'ARC peuvent causer des brûlures oculaires et cutanées.

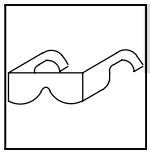
Le rayonnement de l'arc génère des rayons visibles et invisibles intenses (ultraviolets et infrarouges) susceptibles de causer des brûlures oculaires et cutanées. Des étincelles sont projetées pendant le soudage.

- Porter un masque de soudage muni d'un filtre de la nuance adéquate pour se protéger le visage et les yeux pendant le soudage ou pour regarder (voir les normes de sécurité ANSI Z49.1 et Z87.1).
- Porter des lunettes de sécurité à écrans latéraux sous le masque.
- Utiliser des écrans ou des barrières pour protéger les tiers de l'éclat éblouissant ou aveuglant de l'arc ; leur demander de ne pas regarder l'arc.
- Porter des vêtements de protection en matière durable et ignifuge (cuir ou laine) et des chaussures de sécurité.

LE SOUDAGE peut causer un incendie ou une explosion.

Le soudage effectué sur des récipients fermés tels que des réservoirs, des fûts ou des conduites peut causer leur éclatement. Des étincelles peuvent être projetées de l'arc de soudure. La projection d'étincelles, les pièces chaudes et les équipements chauds peuvent causer des incendies et des brûlures. Le contact accidentel de l'électrode avec tout objet métallique peut causer des étincelles, une explosion, un surchauffement ou un incendie. Avant de commencer le soudage, vérifier et s'assurer que l'endroit ne présente pas de danger.

- Se protéger et protéger les tiers de la projection d'étincelles et de métal chaud.
- Ne pas souder à un endroit où des étincelles peuvent tomber sur des substances inflammables.
- Placer toutes les substances inflammables à une distance de 10,7 m de l'arc de soudage. En cas d'impossibilité, les recouvrir soigneusement avec des protections agréées.
- Des étincelles et des matières en fusion peuvent facilement passer même par des fissures et des ouvertures de petites dimensions.
- Surveiller tout déclenchement d'incendie et tenir un extincteur à proximité.
- Le soudage effectué sur un plafond, un plancher, une paroi ou une cloison peut déclencher un incendie de l'autre côté.
- Ne pas souder des récipients fermés tels que des réservoirs, des fûts ou des conduites, à moins qu'ils n'aient été préparés conformément à l'AWS F4.1 (voir les normes de sécurité).
- Brancher le câble sur la pièce le plus près possible de la zone de soudage pour éviter que le courant ne circule sur une longue distance, par des chemins inconnus, et ne cause des risques d'électrocution et d'incendie.
- Ne pas utiliser le poste de soudage pour dégeler des conduites gelées.
- En cas de non utilisation, enlever la baguette d'électrode du porte–électrode ou couper le fil au raz du tube–contact.
- Porter des vêtements de protection exempts d'huile tels que des gants en cuir, une chemise en tissu épais, des pantalons sans revers, des chaussures montantes et un masque.
- Avant de souder, retirer tout produit combustible de ses poches, tel qu'un briquet au butane ou des allumettes.



LES PARTICULES PROJETÉES peuvent blesser les yeux.

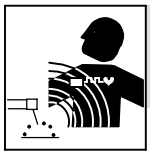
- Le soudage, le burinage, le passage de la pièce à la brosse métallique et le meulage provoquent l'émission d'étincelles et de particules métalliques. Pendant leur refroidissement, les soudures risquent de projeter du laitier.
- Porter des lunettes de sécurité à écrans latéraux agréés, même sous le masque de soudage.

LES ACCUMULATIONS DE GAZ peuvent causer des blessures ou même la mort.

- Couper l'alimentation en gaz protecteur en cas de non utilisation.
- Veiller toujours à bien ventiler les espaces confinés ou porter un respirateur à adduction d'air agréé.

LES PIÈCES CHAUDES peuvent causer des brûlures graves.

- Ne pas toucher les pièces chaudes à main nue.
- Prévoir une période de refroidissement avant d'utiliser le pistolet ou la torche.



LES CHAMPS MAGNÉTIQUES peuvent perturber le fonctionnement des stimulateurs cardiaques.

- Les personnes qui portent un stimulateur cardiaque doivent se tenir à distance.
- Ils doivent consulter leur médecin avant de s'approcher d'un lieu où on exécute des opérations de soudage à l'arc, de gougeage ou de soudage par points.

LE BRUIT peut affecter l'ouïe.

Le bruit de certains processus et équipements peut affecter l'ouïe.

- Porter des protecteurs d'oreille agréés si le niveau sonore est trop élevé.

Les BOUTEILLES endommagées peuvent exploser.

Les bouteilles de gaz protecteur contiennent du gaz sous haute pression. Toute bouteille endommagée peut exploser. Comme les bouteilles de gaz font normalement partie du procédé de soudage, les manipuler avec précaution.

- Protéger les bouteilles de gaz comprimé de la chaleur excessive, des chocs mécaniques, du laitier, des flammes nues, des étincelles et des arcs.
- Placer les bouteilles debout en les fixant dans un support stationnaire ou dans un porte–bouteilles pour les empêcher de tomber ou de se renverser.
- Tenir les bouteilles éloignées des circuits de soudage ou autres circuits électriques.
- Ne jamais poser une torche de soudage sur une bouteille de gaz.
- Ne jamais mettre une électrode de soudage en contact avec une bouteille de gaz.
- Ne jamais souder une bouteille contenant du gaz sous pression – elle risquerait d'exploser.
- N'utiliser que les bouteilles de gaz protecteur, régulateurs, tuyaux et raccords adéquats pour l'application envisagée ; les maintenir en bon état, ainsi que les pièces connexes.
- Détourner la tête lorsqu'on ouvre la soupape d'une bouteille.
- Laisser le capuchon protecteur sur la soupape, sauf en cas d'utilisation ou de branchement de la bouteille
- Lire et suivre les instructions concernant les bouteilles de gaz comprimé, les équipements associés et les publications P–1 de la CGA, mentionnées dans les normes de sécurité.

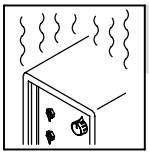
2-3. Autres symboles relatifs à l'installation, au fonctionnement et à l'entretien de l'appareil.

Risque D'INCENDIE OU D'EXPLOSION

- Ne pas placer l'appareil sur une surface inflammable, ni au−dessus ou à proximité d'elle.
- Ne pas installer l'appareil à proximité de produits inflammables.
- Ne pas surcharger l'installation électrique – s'assurer que l'alimentation est correctement dimensionnée et protégée avant de mettre l'appareil en service.

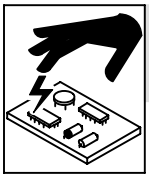
LA CHUTE DE L'APPAREIL peut blesser.

- N'utiliser que l'anneau de levage pour lever l'appareil. NE PAS utiliser le chariot, les bouteilles de gaz ou tout autre accessoire.
- Utiliser un engin de capacité adéquate pour lever l'appareil.
- Si on utilise un chariot élévateur pour déplacer l'unité, s'assurer que les fourches sont suffisamment longues pour dépasser du côté opposé de l'appareil.



L'EMPLOI EXCESSIF peut FAIRE SURCHAUFFER L'ÉQUIPEMENT.

- Prévoir une période de refroidissement ; respecter le cycle opératoire nominal.
- Réduire le courant ou le cycle opératoire avant de reprendre le soudage.
- Ne pas obstruer les orifices ou filtrer l'alimentation en air du poste.



LES CHARGES ÉLECTROSTATIQUES peuvent endommager les circuits imprimés.

- Mettre un bracelet antistatique AVANT de manipuler des cartes ou des pièces.
- Utiliser des pochettes et des boîtes antistatiques pour stocker, déplacer ou expédier des cartes de circuits imprimés.

LES PIÈCES MOBILES peuvent causer des blessures.

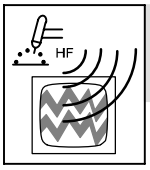
- Se tenir à l'écart des pièces mobiles.
- Se tenir à l'écart des points de coincement tels que les dévidoirs.

LES FILS DE SOUDAGE peuvent causer des blessures.

- Ne pas appuyer sur la gâchette avant d'en avoir reçu l'instruction.
- Ne pas diriger le pistolet vers soi, vers d'autres personnes ou vers toute pièce mécanique en engageant le fil de soudage.

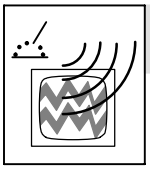
LES ORGANES MOBILES peuvent causer des blessures.

- Se tenir à l'écart des organes mobiles comme les ventilateurs.
- Maintenir fermés et bien fixés les portes, panneaux, recouvrements et dispositifs de protection.



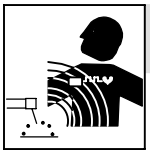
LE RAYONNEMENT HAUTE FRÉQUENCE (H. F.) risque de causer des interférences.

- Le rayonnement haute fréquence peut causer des interférences avec les équipements de radionavigation et de communication, les services de sécurité et les ordinateurs.
- Ne demander qu'à des personnes qualifiées familiarisées avec les équipements électroniques de faire fonctionner l'installation.
- L'utilisateur est tenu de faire corriger rapidement par un électricien qualifié les interférences causées par l'installation.
- Si la Federal Communications Commission signale des interférences, arrêter immédiatement l'appareil.
- Faire régulièrement contrôler et entretenir l'installation.
- Maintenir soigneusement fermés les panneaux et les portes des sources de haute fréquence, maintenir le jeu d'éclatement au réglage adéquat et utiliser une terre et un blindage pour réduire les interférences éventuelles.



LE SOUDAGE À L'ARC peut causer des interférences.

- L'énergie électromagnétique peut causer des interférences avec l'équipement électronique sensible tel que les ordinateurs et l'équipement commandé par ordinateur tel que les robots.
- Veiller à ce que tout l'équipement de la zone de soudage soit compatible au point de vue électromagnétique.
- Pour réduire la possibilité d'interférence, maintenir les câbles de soudage aussi courts que possible, les grouper, et les poser aussi bas que possible (par ex. : à terre).
- Veiller à souder à une distance de 100 mètres de tout équipement électronique sensible.
- Veiller à ce que le poste de soudage soit posé et mis à la terre conformément au présent manuel.
- En cas d'interférences après exécution des directives précédentes, il incombe à l'utilisateur de prendre des mesures supplémentaires telles que le déplacement du poste, l'utilisation de câbles blindés, l'utilisation de filtres de ligne ou la pose de protecteurs dans la zone de travail.



LES CHAMPS MAGNÉTIQUES peuvent affecter les stimulateurs cardiaques.

- Porteurs de stimulateur cardiaque, restez à distance.
- Les porteurs d'un stimulateur cardiaque doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de gougeage ou de soudage par points.

2-4. Principales normes de sécurité

Safety in Welding, Cutting, and Allied Processes, norme ANSI Z49.1, de l'American Welding Society, 550 N.W. LeJeune Rd, Miami FL 33126 (téléphone : (305) 443–9353, site Web : www.aws.org).

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping, norme American Welding Society AWS F4.1, de l'American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126 (téléphone : (305) 443–9353, site Web : www.aws.org).

National Electrical Code, norme NFPA 70, de la National Fire Protection Association, P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269–9101 (téléphone : (617) 770–3000, sites Web : www.nfpa.org et www.sparky.org).

Safe Handling of Compressed Gases in Cylinders, brochure CGA P–1, de la Compressed Gas Association, 1735 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202–4102 (téléphone : (703) 412–0900, site Web : www.cganet.com).

Code for Safety in Welding and Cutting, norme CSA W117.2, de la Canadian Standards Association, Standards Sales, 178 boulevard Rexdale, Rexdale (Ontario) Canada M9W 1R3 (téléphone : (800) 463–6727 ou à Toronto : (416) 747–4044, site Web : www.csa–international.org).

Practice For Occupational And Educational Eye And Face Protection, norme ANSI Z87.1, de l'American National Standards Institute, 11 West 42nd Street, New York, NY 10036–8002 (téléphone : (212) 642–4900, site Web : www.ansi.org).

Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, norme NFPA 51B, de la National Fire Protection Association, P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269–9101 (téléphone : (617) 770–3000, site Web : www.nfpa.org et www.sparky.org).

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, de l'U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250 (il y a 10 bureaux régionaux – Téléphone pour la Région 5, Chicago : (312) 353–2220, site Web : www.osha.gov).

2-5. Information sur les champs électromagnétiques

Données sur le soudage électrique et les effets des champs magnétiques basse fréquence sur l'organisme

En parcourant les câbles de soudage, le courant crée des champs électromagnétiques. Les effets potentiels de tels champs restent préoccupants. Cependant, après avoir examiné plus de 500 études qui ont été faites pendant une période de recherche de 17 ans, un comité de spécialistes du National Research Council a conclu : « L'accumulation de preuves n'a pas démontré que l'exposition aux champs magnétiques et aux champs électriques à haute fréquence constitue un risque pour la santé humaine ». Toutefois, les études et l'examen des preuves se poursuivent. En attendant les conclusions finales de la recherche, il serait souhaitable de réduire l'exposition aux champs électromagnétiques pendant le soudage ou le coupage.

Afin de réduire les champs électromagnétiques en milieu de travail, respecter les consignes suivantes :

1. Garder les câbles ensemble en les torsadant ou en les fixant avec du ruban adhésif.

2. Mettre tous les câbles du côté opposé à l'opérateur.

3. Ne pas s'enrouler les câbles autour du corps.

4. Garder le poste de soudage et les câbles le plus loin possible de soi.

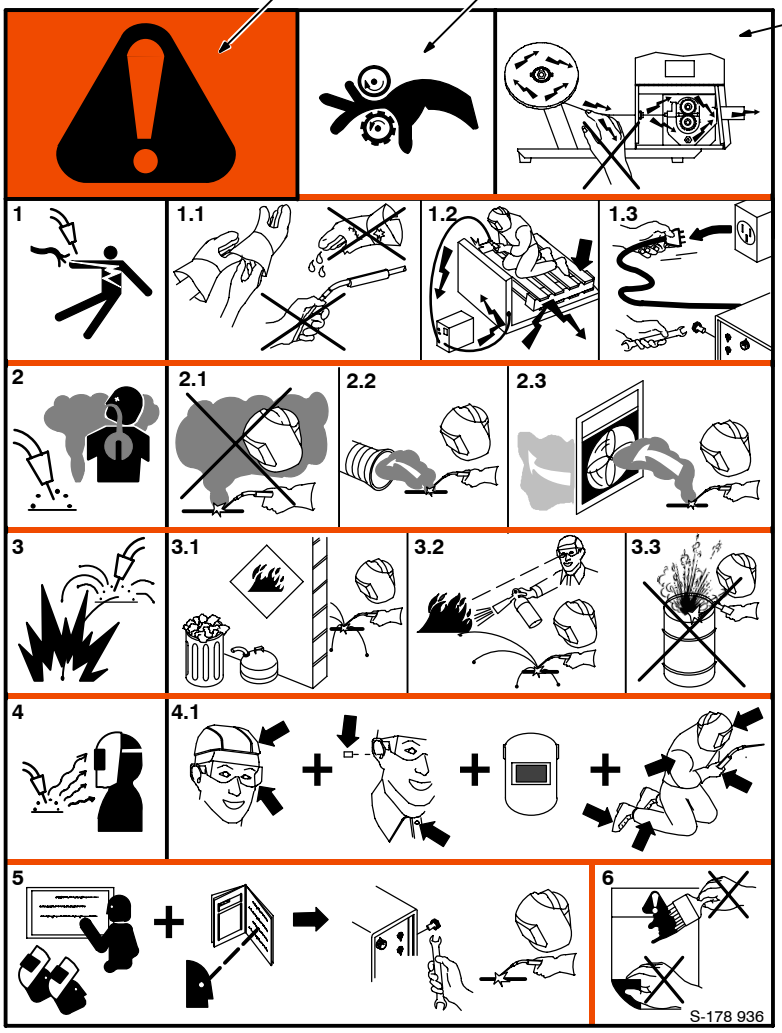
5. Placer la pince de masse le plus près possible de la zone de soudage.

Consignes relatives aux stimulateurs cardiaques :

Les personnes qui portent un stimulateur cardiaque doivent avant tout consulter leur médecin. Si ce dernier les déclare aptes, il leur est recommandé de respecter les consignes ci-dessus.

SECTION 3 – DEFINITIONS

3-1. Warning Label Definitions



Warning! Watch Out! There are possible hazards as shown by the symbols.

Drive rolls can injure fingers

Welding wire and drive parts are at welding voltage during operation – keep hands and metal objects clear.

1 Electric shock can kill.

1.1 Wear dry insulating gloves. Do not touch electrode with bare hand. Do not wear wet or damaged gloves.

1.2 Protect yourself from electric shock by insulating yourself from work and ground.

1.3 Disconnect input plug or power before working on machine.

2 Breathing welding fumes can be hazardous to your health.

2.1 Keep your head out of the fumes.

2.2 Use forced ventilation or local exhaust to remove the fumes.

2.3 Use ventilating fan to remove fumes.

3 Welding sparks can cause explosion or fire.

3.1 Keep flammables away from welding. Don't weld near flammables.

3.2 Welding sparks can cause fires. Have a fire extinguisher nearby and have a watch person ready to use it.

3.3 Do not weld on drums or any closed containers.

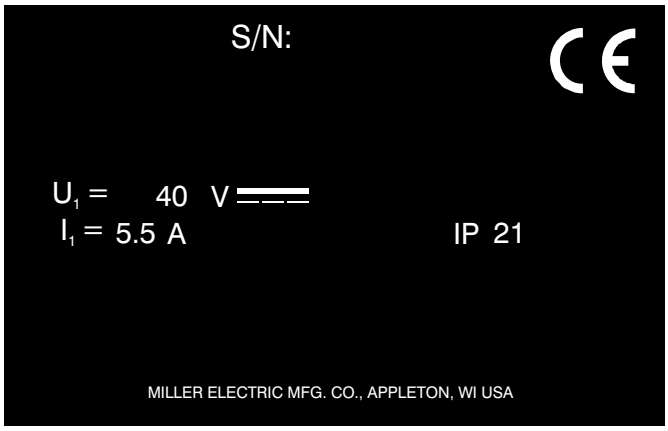
4 Arc rays can burn eyes and injure skin.

4.1 Wear hat and safety glasses. Use ear protection and button shirt collar. Use welding helmet with correct shade of filter. Wear complete body protection.

5 Become trained and read the instructions before working on the machine or welding.

6 Do not remove or paint over (cover) the label.

3-2. Manufacturer's Rating Label For CE Products



For label location see Section 5-4.

220 498-A

3-3. Symbols And Definitions

NOTE	*Some symbols are found only on CE products.*

	Output	A	Amperes	V	Volts	⎓	Direct Current (DC)
X	Duty Cycle		Wire Feed	%	Percent	IP	Degree Of Protection
	Input		Cold Jog (Inch) Towards Workpiece		Purge By Gas		Fast
	Constant Current		Circuit Breaker		Constant Voltage		Slow
	Trigger Hold Off		Trigger Hold On	I_2	Rated Welding Current		Increase
	Read Instructions	U_1	Primary Voltage	U_2	Conventional Load Voltage		Locked
I_1	Primary Current		Sequence		Program		Process
	Wire Type		Gas Type		Arc Control	t	Time
	Arc Control		Trigger Control		Trigger Hold On Indicator Light	○	Trigger Hold Off Indicator Light
1~	Single Phase	3~	Three Phase		Line Connection		Increase

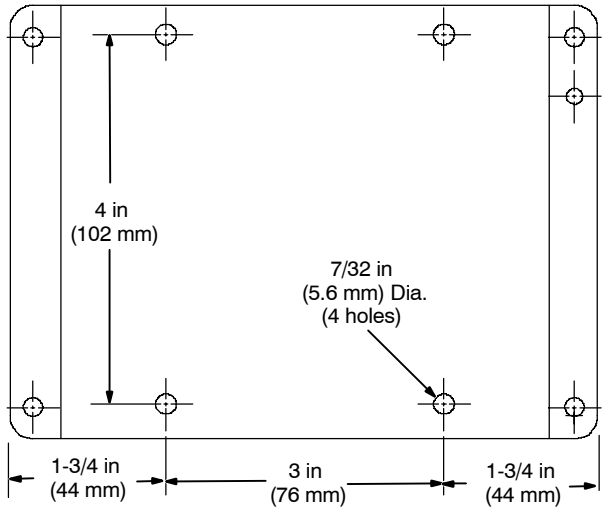
SECTION 4 – INTRODUCTION

4-1. Specifications

Type of Input Power	Welding Power Source Type	Wire Feed Speed Range	Wire Diameter Range	Overall Dimensions	Weight
40 Volts DC 10 Amperes	Axcess Series	Standard: 40 To 1400 ipm (1.0 To 35.6 mpm)	.035 To 1/16 in (0.8 To 1.6 mm) Max Spool Weight: 60 lb (27 kg)	Length: 7 in (178 mm) Width: 7 in (178 mm) Height: 12 in (305 mm)	11 lb (5 kg)

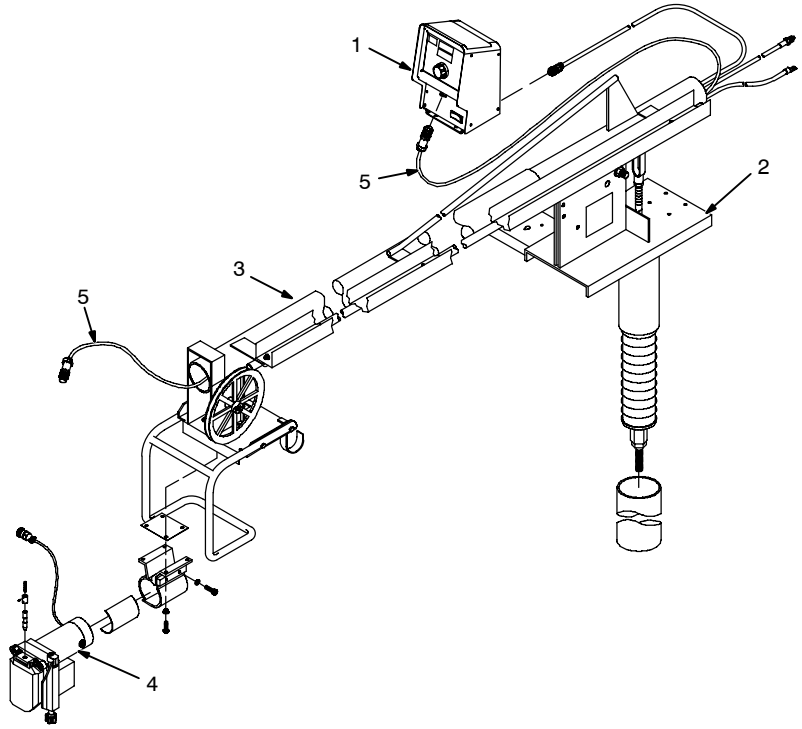
SECTION 5 – INSTALLATION

5-1. Mounting Plate Hole Layout



Ref. 200 553-A

5-2. Remote Operator Interface And Wire Drive Installation

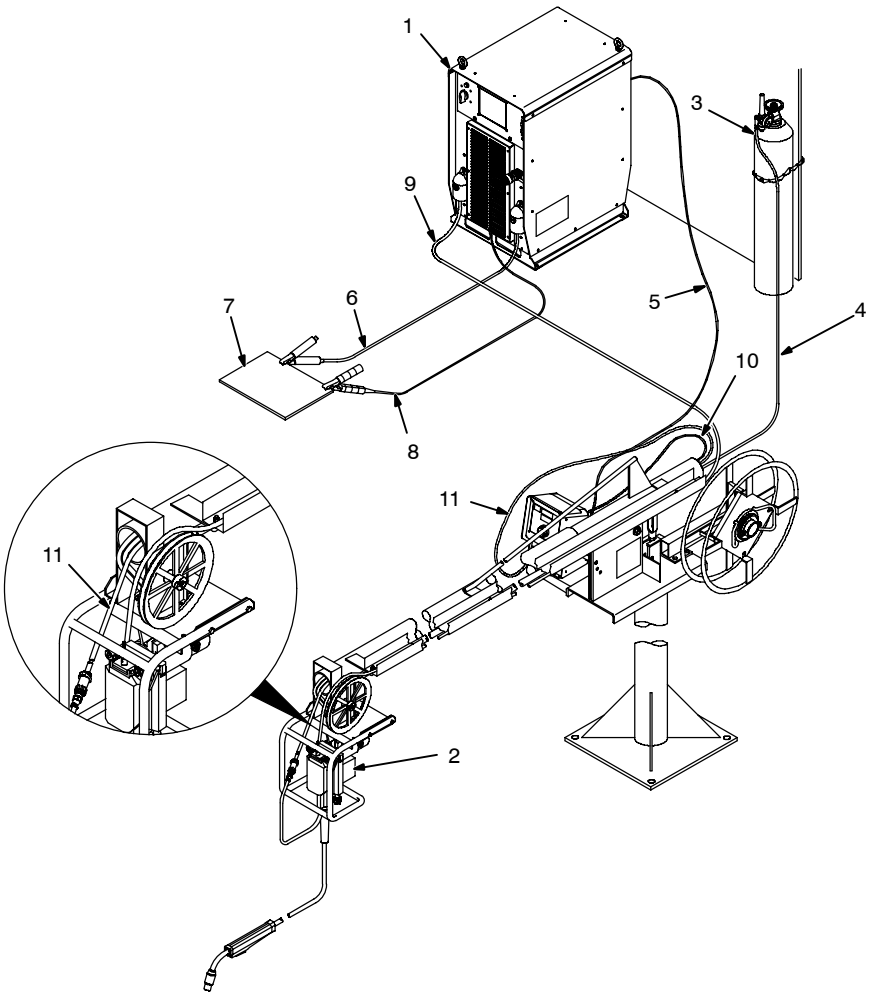


Typical Swingarc installation shown; however, various installations are possible depending on the application.

1 Remote Operator Interface
2 Swingarc Swivel Assembly
3 Boom
4 AA40G Wire Drive Assembly
5 Trigger Cable

Ref. 803 697-E

5-3. Connection Diagram



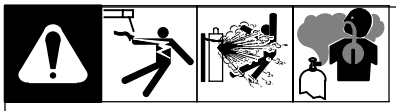
1 Welding Power Source
2 Wire Feeder
3 Gas Cylinder
4 Gas Hose
5 Network Feeder Cable
6 Negative (–) Weld Cable
7 Workpiece
8 Voltage Sensing Lead (Optional)

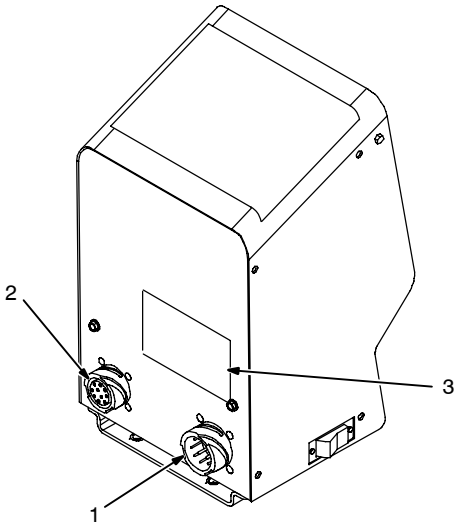
☞ *Positive (+) voltage sensing lead is contained in the motor cable.*

9 Positive (+) Weld Cable
10 Motor Cable
11 Trigger Cable

803 698-E

5-4. Rear Panel Connections

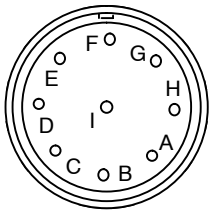




1 9-Pin Network Receptacle
2 Motor Control/Shielding Gas Valve Receptacle
3 Rating Label Location

Ref. 803 503-A

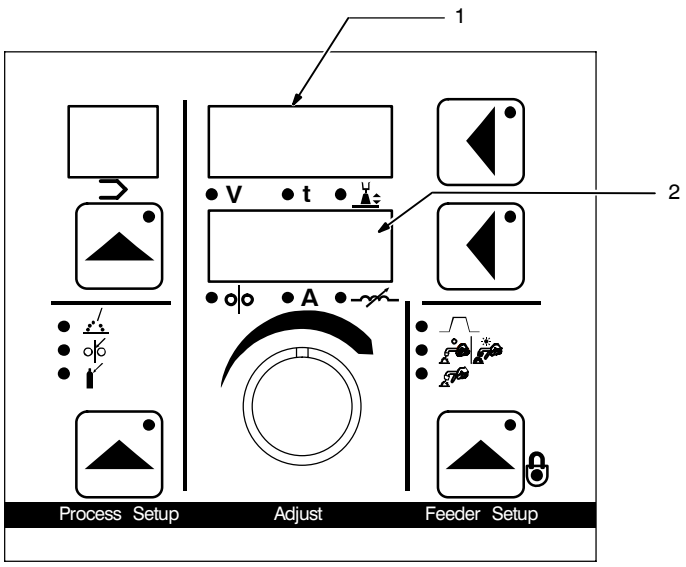
5-5. 9-Pin Network Receptacle Information

REMOTE 9	Pin	Pin Information
	A	Capacitor C1 to ground
	B	Shield
	C	Volt sense
	D	Can low
	E	Can high
	F	+24 volts dc common
	G	+ 24 volts dc
	H	Motor voltage +40 volts dc common
	I	Motor voltage +40 volts dc

5-6. Gun Recommendation Table

Process	Gun
GMAW – Hard or Cored Wires	400, 500, And 600 Amp Air-Cooled Guns
GMAW – Pulse	Water-Cooled Guns

5-7. Power Source Display At Power Up



1 Upper Display
2 Lower Display

Power Source	Upper Display	Lower Display	Voltage Range	
	Net	Wait		
	DTEC	OFF		
Axcess	Axcs	300/450/675	10	44

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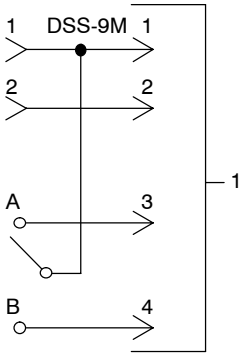
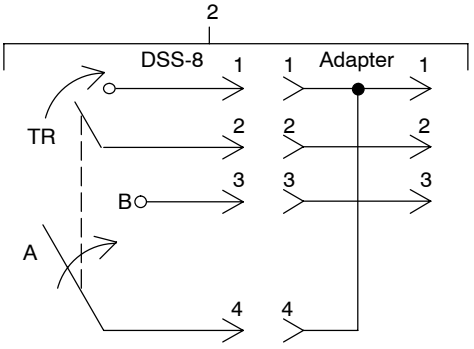
5-8. Dual Schedule Switch Options





1 Maint 2P (Maintained-Contact 2-Pole Switch)

DSS-9M Part# 041 793

2 Maint 1P (Maintained-Contact 1-Pole Switch)

DSS-8 Part# 079 693 And Adapter Part# 157 364

SECTION 6 – OPERATION

6-1. Operational Terms

The following is a list of terms and their definitions as they apply to the interface unit in the wire feeder:

General Terms:

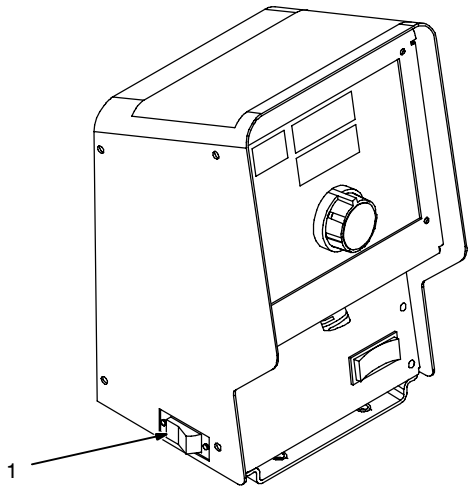
Arc Adjust	Term used to represent arc length adjustments in pulse programs. Increasing Arc Adjust increases the actual arc length. Likewise, decreasing arc adjust shortens arc length. Arc Adjust is replaced by volts in MIG programs.
Trigger Control	Selecting Trigger Control allows activating trigger functions such as DS, TH, 4T, TDS, and TPS.
DS (Dual Schedule)	Dual Schedule allows selecting a pair of programs that can be used together.
TH (Trigger Hold)	Trigger Hold allows the operator to feed wire without continuously pressing the gun trigger. In trigger hold mode, momentarily press gun trigger, and wire will feed until gun trigger is momentarily pressed again.
4T	4T allows the operator to select between weld parameters and crater parameters using the gun trigger. Crater time must be set for at least 0.2 seconds to make this function operational. If gun trigger is released during welding, unit goes into trigger hold, then pressing and holding trigger again causes unit to stay in crater until trigger is released and crater parameter times out.
TDS (Trigger Dual Schedule)	TDS allows the operator to select between a pair of weld programs by using the gun trigger. In TDS mode, momentarily pressing the gun trigger allows the operator to cycle between a pair of preselected weld programs.
TPS (Trigger Program Schedule)	TPS allows the operator to select weld programs by using the gun trigger. In TPS mode, momentarily pressing the gun trigger allows the operator to cycle through preselected weld programs up to a total of 8 programs.
Program	Eight active slots for selection of various processes, wire type, and parameters.
Process	A selection made for MIG, Pulse, Accu-pulse, and RMD (optional).
MIG	CV weld process with individual settings of voltage and wire speed.
Pulse	Conventional pulse program using peak, background, pulse width, frequency, and peak voltage as factory taught data. Adaptive method is controlled by frequency adjustment.
Accu-pulse	Pulse process utilizing constant current ramps with constant voltage control of peaks and backgrounds. Adaptive response is controlled by peak and minimum current levels. Benefits are shorter arc lengths, better puddle control, more tolerant of tip-to-work variation, less audible noise, no arc wandering, allows weld to fill in at toes increasing travel speed and deposition, and more tolerant to poor fit up and gaps.
RMD (optional)	RMD refers to Regulated Metal Deposition. A precisely controlled short-circuit transfer. Benefits of RMD are well suited to thin materials, improves gap filling and spatter reduction. Provides less heat input into workpiece, minimizes distortion and allows use of larger diameter wire on thin gauge materials.
Wire Type	Selection of wire type by alloys and classification.
Gas Type	Selection of shielding gas being used in application.
Process Set Up	Selection procedure for entering program.
Program Load	Enters selected program information into program slot.
Volts	Preset voltage in MIG mode at idle, actual voltage while welding, and 3 seconds hold value at end of weld.
Time	Indicates time values being set for timed functions (e.g. Preflow, Postflow which are only available in the Arc On and Analog input or the Arc On and No Analog input modes).
Arc Length	Distance from end of wire electrode to workpiece.
WFS	Term used to represent wire feed speed. In MIG mode, wire feed setting is independent of voltage setting. In pulse, Accu-pulse, and RMD (optional) adjusting wire feed speed also increases power level on wire electrode (one knob control).
Amps	Indicates average amperage while welding and 3 seconds hold value at end of weld.
Arc Control	Allows setting of inductance in MIG mode. In pulse and Accu-pulse mode, this adjustment changes the arc cone by adjusting the preprogrammed factory pulse data. In RMD (optional), this control will affect the in much the same way as inductance.
Inductance	In short circuit GMAW welding, an increase in inductance will decrease the number of short circuit transfers per second (provided no other changes are made) and increase the arc-on time. The increased arc-on time makes the welding puddle more fluid.
Adjust	Control knob used to change or set parameters and functions.
Sequence	Selecting Sequence will allow setting of preflow, start, crater, and postflow times and parameters.
Preflow	Setting a time value for gas flow prior to arc start.
Start	Provides voltage/arc adjust, wire feed rate, and time value for modified arc starts (which is only adjustable with the optional PDA with File Management/WaveWriter software).

General Terms:

Crater	Allows setting of voltage/arc adjust, wire feed rate, and time value for arc ends.
Postflow	Setting a time value for gas flow after arc end.
Feeder Set Up	Allow selection of Sequence and trigger functions.
Auto Thread	Method of jogging wire without holding jog or trigger switch. Pressing Jog and Retract simultaneously will automatically feed wire. Default setting is 192 at a feed rate of 700 ipm (these values can be changed using a PDA with File Management/WaveWriter software). Pressing jog, purge, or trigger switch will terminate the auto-threading feature.

6-2. Power Switch

1 Power Switch



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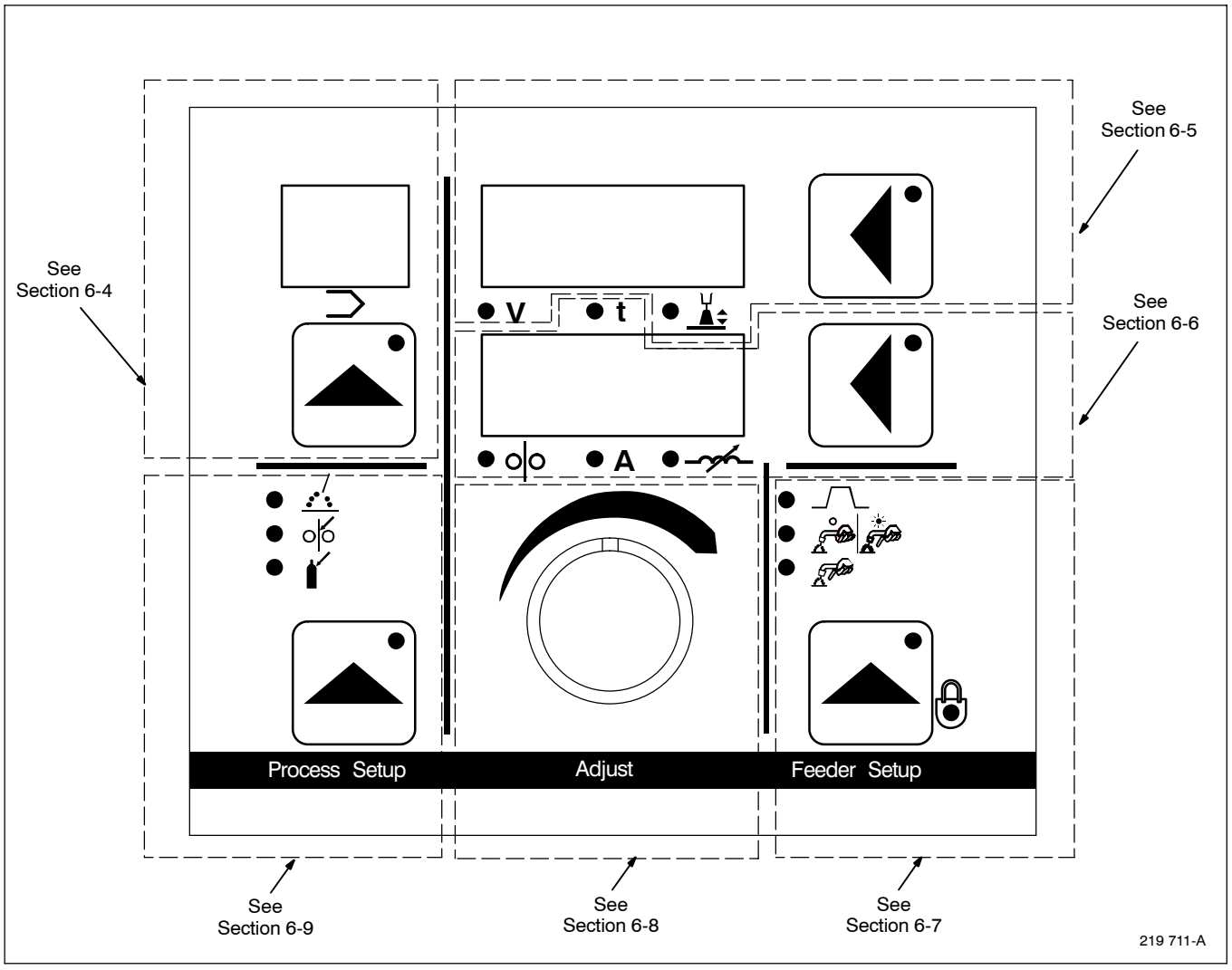
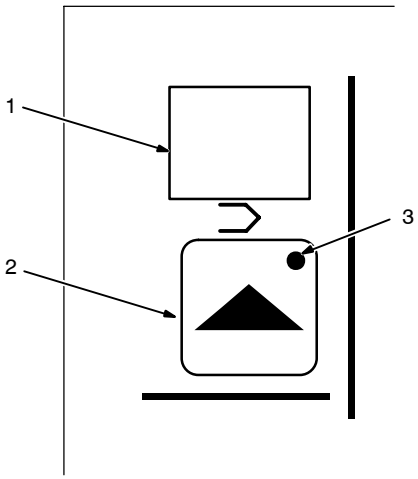
6-3. Front Panel Sections



6-4. Program Push Button



1 Program Display

The number of the active program is displayed.

2 Program Push Button

3 Program Push Button LED

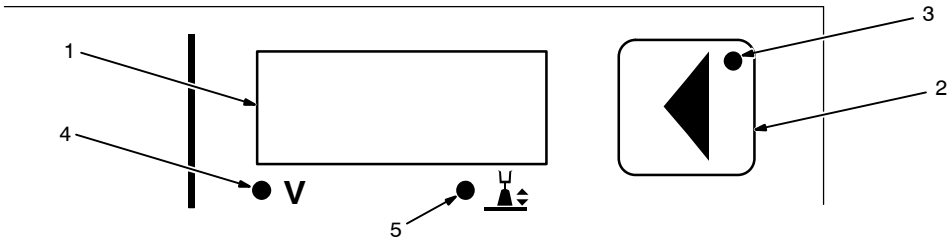
The LED lights to indicate that programs can be changed using the Adjust knob.

Momentarily press button to illuminate LED. To change the program number, rotate Adjust knob to select one of eight programs.

Pressing and holding the push button will display current wire size, wire type and process.

To reset feeder to factory settings, turn power source off for 10 seconds. Press and hold button in on power up, wait until top display shows RST and bottom display shows NO before releasing button. Feeder Set Up button LED will begin flashing. Turn Adjust knob to change bottom display to show YES, then press Feeder Set Up button to confirm selection. The top display will show CYCL and the lower display will show PWR. Turn welding power source power off for 10 seconds, then turn power back on again.

6-5. Upper Display



1 Upper Display

The upper display at idle (not welding) shows preset volts with process selection MIG or Arc Adjust for all other processes. When welding, the display shows actual voltage. The display will show actual voltage for approximately 3 seconds after welding stops before returning to preset value.

2 Upper Display Push Button

Press the button to illuminate the LED and allow changing information in the display.

3 Upper Display Push Button LED

The upper display push button LED illuminates to indicate that information displayed can be changed by the Adjust knob.

4 Volts LED

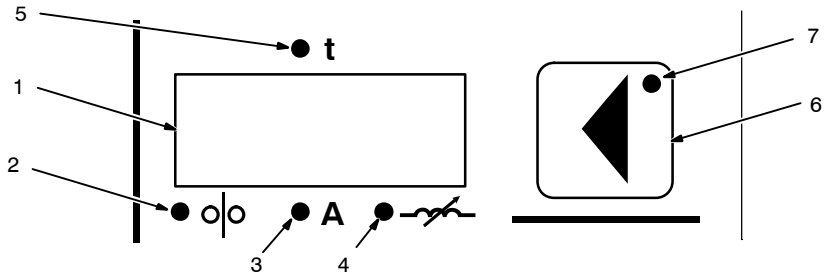
Indicates a voltage value is being displayed, preset voltage in MIG when not welding and actual voltage while welding.

5 Arc Adjust LED

Indicates that displayed value is an arc length value when the process is Pulse, Accu-pulse, or RMD (optional).

☞ *At any time while welding, the display allows adjustment of the weld voltage or arc adjust preset values by turning the Adjust knob. The preset values will be displayed while the knob is being rotated and return to displaying actual values when adjustment is completed.*

6-6. Lower Display



1 Lower Display

The lower display shows WFS (wire feed speed), AMPS (amperage), ARC CTL (arc control), or Time. The feeder displays only preset wire speed at idle (not welding). While welding, the average amperage is displayed. The lower display shows welding sequence time when the Time LED is illuminated.

2 WFS (Wire Feed Speed) LED

LED illuminates to indicate the preset wire feed value is being displayed and can be adjusted using the Adjust knob.

3 Amps LED

LED illuminates to indicate the average amperage is being displayed while welding and for 3 seconds after welding is terminated. The amperage must be above a minimum value of 25 amps for this function to operate.

4 Arc Ctl (Arc Control) LED

LED illuminates to indicate that inductance (MIG) or ARC [Pulse, Accu-pulse, or RMD (optional)] is being displayed and can be adjusted using the Adjust knob.

5 Time LED

LED illuminates to indicate that a time value is being displayed for a sequence function and can be adjusted using the Adjust knob.

6 Lower Display Push Button

7 Lower Display Push Button LED

Pressing the button illuminates the LED and selects either WFS or Arc Ctl value for changing using the Adjust knob.

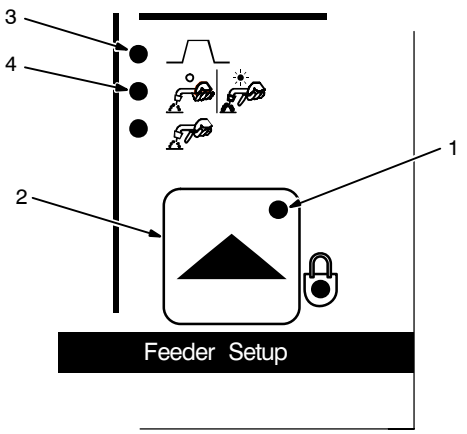
To select Arc Ctl, press and hold lower display button for 2 seconds. The top display will show either INDU for a MIG program or ARC for Pulse, Accu-pulse, or RMD (optional). To exit Arc Ctl or INDU, either press the upper display push button or press and hold the lower display push button for 2 seconds.

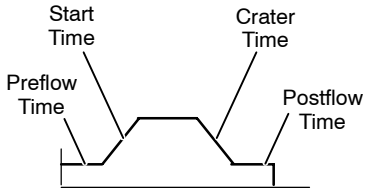
When the lower display push-button LED and the WFS LED are both illuminated, it is possible to change WFS while welding by using the Adjust knob. The value in the display will switch momentarily to show preset wire feed speed while turning the Adjust knob and revert back to actual value when adjustment is completed.

When the Arc Ctl LED is illuminated, it is possible to change values while welding by using the Adjust knob. To return to actual values on the display, exit the Arc Ctl display.

☞ *The lower display push button has additional functions when entering the sequence and trigger control functions (see Section 6-7).*

6-7. Feeder Set Up Push Button





Sequence Diagram

1 Feeder Set Up Push Button LED

2 Feeder Set Up Push Button

- Press button to choose Sequence. Feeder Set Up push-button LED will illuminate.

3 Sequence LED

- When the Feeder Set Up button is pressed once, the Sequence LED will illuminate and the upper display will show sequence options. Use the Adjust knob to select PRE (preflow), STRT (start), CRTR (crater), or POST (postflow).
- Press the lower display push button and the Lower Display push-button LED will illuminate as well as the lower display. The Time LED will automatically begin flashing indicating that a time value can be entered by turning the Adjust knob. By entering a time value the sequence state will become active. To turn off a sequence state, change the time value to OFF. To step back for selecting another sequence option, press the Upper Display push button.
- The Sequence option STRT and CRTR will have additional parameter settings. By pushing the Lower Display push button a second time, while STRT or CRTR appear in the upper display, allows entering voltage (MIG) or Arc Adjust [Pulse, Accu-pulse, or RMD (optional)]. Use the Adjust knob to change the values indicated by the flashing LED for either Volts or Arc Adjust. Pressing the Lower Display push button a third time will activate the WFS setting for either STRT or CRTR and the WFS LED will begin flashing. Use the Adjust knob to change the WFS value.
- Pressing the Feeder Set Up button two more times will exit the Sequence menu and return the system to standby mode.

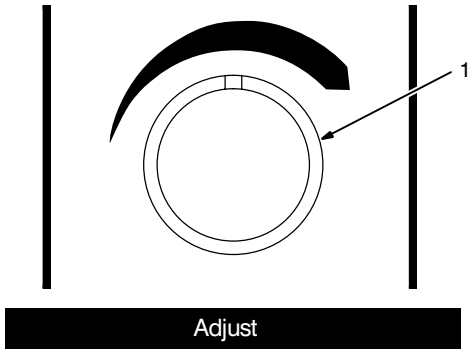
4 Trigger Control LED

- Press the Feeder Set Up button twice and the Trigger Control LED will illuminate, and the upper display will show the different trigger control selections. Use the Adjust knob to cycle through the trigger control methods as follows: DS, TH, TDS, TPS, and 4T (see Section 6-1 for definitions). The lower display will show the current state of each trigger control method as being on or off. Not all trigger control methods are compatible with each other, therefore, turning on certain trigger selections will cause other trigger selections to turn off.
- Press the lower display push button to illuminate the push-button LED and enable the use of the Adjust knob to allow turning selected trigger control methods on or off. If trigger hold is set to on, the Trigger Hold LED will illuminate.

☞ *Trigger Hold is automatically set to On with the 4T trigger selection. This is part of the 4T function.*

- Press the Feeder Set Up button a third time to cycle back to standby mode.

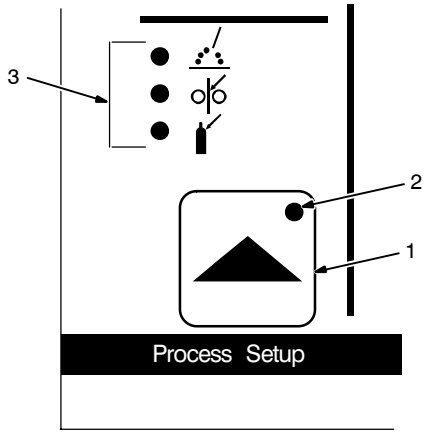
6-8. Adjust Knob



1 Adjust Knob

The Adjust knob is used to change functions and parameters. Refer to the front panel sections for information regarding use of this control.

6-9. Process Set Up Push Button



1 Process Set Up Push Button
2 Process Set Up LED
3 Program Selection LEDs

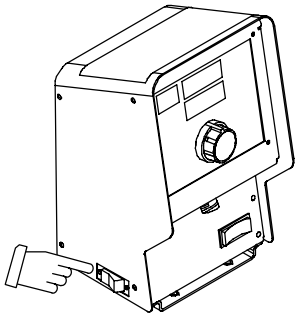
- Press the Process Set Up push button the first time will illuminate the button LED and the Process LED. The upper and lower displays will be used for Accu-pulse and only the lower display for MIG, Pulse and RMD (optional) to show the current process installed in this program. To change process, turn the adjust knob.
- Pressing the Process Set Up push button a second time will illuminate the Wire Type LED and the lower display will show wire types available for selected processes (see Table 4-1 for wire abbreviation). To make a selection, turn the Adjust knob.
- Pressing the Process Set Up push button a third time will keep Wire Type LED lit and the upper display will show wire alloy type (see Table 4-1 for alloy types). The upper display push-button LED will be flashing indicating that turning the Adjust knob will change the alloy type for the selected process and wire type.
- Pressing the Process Set Up push button a fourth time will keep Wire Type LED lit and the upper display will show wire size. The upper display push button will be flashing indicating that turning the Adjust knob will select wire sizes available for that particular process and wire type.
- Pressing the Process Set Up push button a fifth time will illuminate the Gas Type LED and the lower display will show GAS and the upper display will show gas selection (see Table 4-1 for gas abbreviations). To make a gas type selection, turn the Adjust knob.
- If any of the Process, wire type, alloy type, wire size, or gas type was changed, then pressing the Process Set Up push button a sixth time will show PROG in the upper display and LOAD in the lower display. The new program would be loaded for that particular program in slot 1 thru 8. If no changes were made to any setup items, no program will be loaded, and unit will return to standby mode.
- If a custom program is loaded using an optional PDA with File Management software, the Program Display will have a “C” in front of the program number. This indicates that the program is not a factory default program and has been modified. By selecting or changing any process variable and performing a program load will restore the program back to the factory default program.

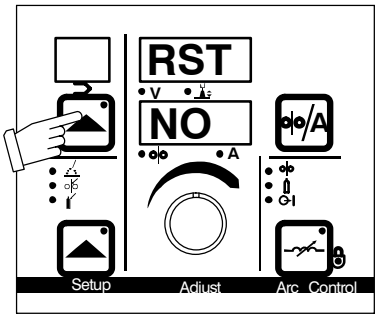
Table 4-1. Welding Wire And Gas Abbreviations*

Wire Description	Wire Abbreviation	Alloy Type	Gas Type	Gas Abbreviation
Steel	STL	E70, E100, E120	100% CO_2, 90% Argon/10% CO_2, 85% Argon/15% CO_2, 75% Argon/25% CO_2, 95% Argon/5% CO_2, 95% Argon /5% O_2, 98% Argon/2% O_2	CO2 C10 C15 C25 C5 OX5 OX2
Stainless Steel	SS	308, 309, 312, 316	98% Argon, 2% O_2 (81Ar/18HE/1CO_2 Accu-pulse) 90HE/7-1/2Ar/2-1/2CO_2 MIG/RMD)	OX2 Tri Gas Tri Gas
Cored Tubular Wire	MCOR	71, 76, 86R, 409	90% Argon/10% CO_2	C10
			98% Argon/2% O_2	OX2
Aluminum	ALUM	4XXX, 5XXX	100% Argon	ARGN

* Not all wire types may be available with your unit.

6-10. Reset Mode



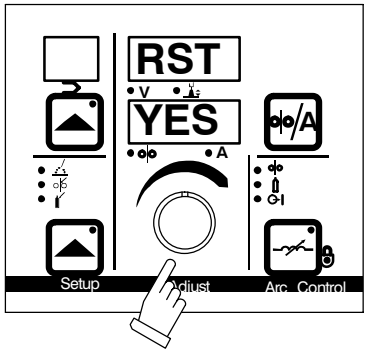


☞ *Reset mode is not active when Program Lock is enabled.*

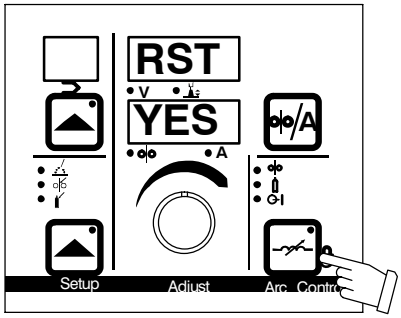
The reset mode allows the operator to reload factory program settings for all eight active programs in the unit.

☞ *System configuration data will be lost during the Reset operation.*

Enter reset mode by turning power On and pressing the Program Push Button until the RST NO message is displayed. RST NO message will not display until after the power-up sequence is completed (approximately 20 seconds).



Rotate Adjust knob to change NO to YES.

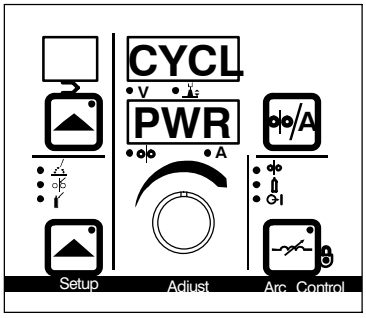


Press the Arc Control button to confirm the reset.

The reset message is displayed for 2 seconds while factory program settings are being reloaded.

During the reset mode the following factory default programs are loaded into the unit:

Program 1	Pulse .035 Mild Steel 90% Argon, 10% CO_2
Program 2	MIG .035 Mild Steel 75% Argon, 25% CO_2
Program 3	Accu-pulse .035 Mild Steel 90% Argon, 10% O2
Program 4	Pulse .045 Mild Steel 90% Argon, 10% CO_2
Program 5	MIG .045 Mild Steel 75% Argon, 25% CO_2
Program 6	Accu-pulse .045 Mild Steel 90% Argon, 10% O2
Program 7	Pulse .052 Mild Steel 90% Argon, 10% CO_2
Program 8	MIG .052 Mild Steel 75% Argon, 25% CO_2



Cycl Pwr message appears on the display when programs complete loading.

Turn power off, wait 10 seconds, and turn power back on again to complete the reset operation.

☞ *After Reset is complete, be sure to load appropriate programs that contain the correct wire size, process, and shielding gas for the welding operation*

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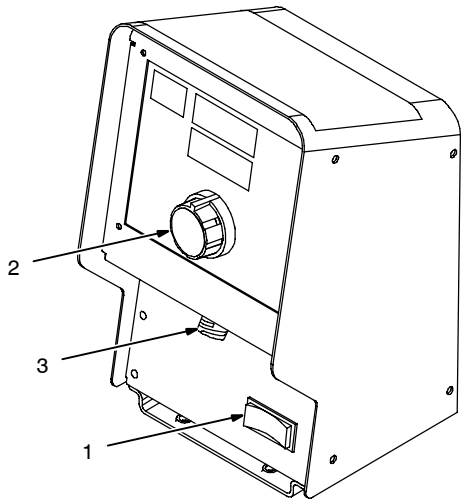
6-11. Jog/Purge



1 Jog/Purge Push Button
2 Adjust Control
3 Gun Trigger Receptacle

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The Jog/Purge switch provides the following functions:

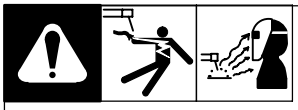
- Pressing left side of the Jog/Purge switch allows the operator to feed wire without energizing the weld power or gas valve circuit. The wire will feed at a 60 ipm rate for 3 seconds, then the rate ramps up to 700 ipm until the Jog switch is released.
- The unit also provides the ability to jog the wire feeder by means of the gun trigger. When the gun trigger is pressed without starting an arc, the wire will feed at run-in speed for the first 3 seconds. During this time OCV (open circuit voltage) will be present as indicated on feeder upper display. After 3 seconds the weld output turns off and the wire will feed at 60 ipm for the next 3 seconds and then ramps up to 700 ipm until trigger is released or 30 seconds elapses. If the gun trigger is still activated after 30 seconds, the jog operation is terminated to prevent complete unspooling of the wire and an “ERR STRT” message is displayed on the upper and lower displays. Releasing and pressing the trigger again will clear the error.

  ☞ *If Start Error is enabled using an optional PDA with File Management/WaveWriter software, an “ERR STRT” will occur after the first 3 seconds of run in and jogging from the trigger is not possible.*

- Pressing right side of the Jog/Purge switch allows the operator to purge gas lines before welding and to preset gas pressure at the regulator.
- This unit is equipped with Auto Thread capability. By rocking the switch from purge to jog within 0.5 seconds will automatically feed wire for a factory default setting of 192 in (4877 mm) of wire before stopping. The default feed rate is 700 ipm. These settings can be changed using an optional PDA with File Management/WaveWriter software.

SECTION 7 – SETTING SEQUENCE PARAMETERS

7-1. Sequence Parameters In A Program



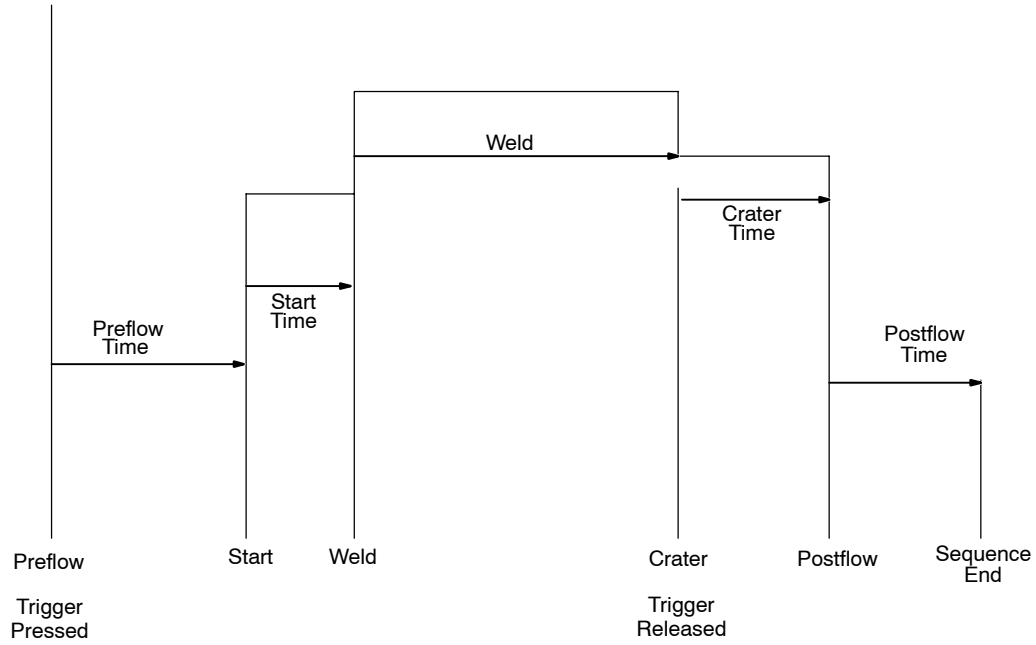
☞ *For more information on Sequence mode, see Feeder Set Up Push Button in Section 6-7.*

Weld Time can only be set by using an optional PDA with File Management/WaveWriter software.

If time is set to zero in any timed sequence, the sequence is skipped.

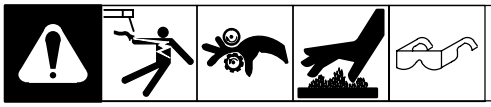
☞ *Maximum IPM may actually be lower depending on the process and wire type selection.*

Sequence	Parameters		
	Volts/Arc Adjust	IPM	Seconds
1. Preflow			Off-5.0
2. Postflow			Off-5.0
3. Start	10.0-44.0/ 0-99	40-1400	Off-5.0
4. Crater	10.0-44.0/ 0-99	40-1400	Off-5.0



SECTION 8 – MAINTENANCE

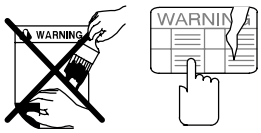
8-1. Routine Maintenance



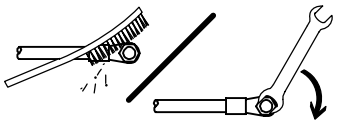
▲ **Disconnect power before maintaining.**

3 Months

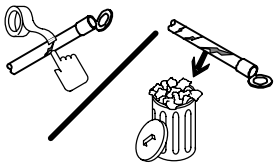
Replace unreadable labels.



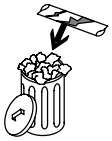
Clean and tighten weld terminals.



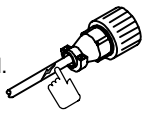
Repair or replace cracked weld cable.



Replace cracked parts.

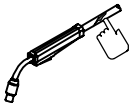


Check control cord.



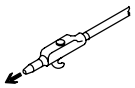
Check gas hose and fittings.

Check gun cable.

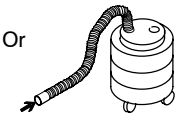


6 Months

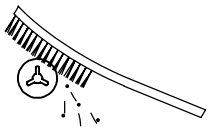
Blow out or vacuum inside. During heavy service, clean monthly.



Or



Clean drive rolls.



8-2. Diagnostics

The following error messages are shown on the upper and lower displays to indicate specific errors. Explanations are in the text below:

ERR SENS	ERR TACH	ERR MOTR	ERR WFS	ERR STRT	ERR STOP
Indicates a voltage sense error.	Indicates a tachometer error.	Indicates a motor error.	Indicates a wire feed speed error.	Indicates an arc start error.	Indicates an arc stop error.

ERR FLOW	ERR COOL	ERR FTP	ERR GND	ERR STUK	ERR PSF
Indicates a gas flow error.	Indicates a coolant flow error.	Indicates a file transfer point error.	Indicates a ground current error.	Indicates a wire stuck error.	Indicates a primary power error.

ERR SENS

- **The voltage sense error** indicates no voltage sensing feedback signal. Check connections at feeder and welding power source. Press Jog/Purge button to clear error.

ERR TACH

- **The tach error** occurs 2 seconds after the loss of tachometer feedback. The motor speed is regulated through the monitoring of voltage and current. Press Jog/Purge button to clear error.

ERR MOTR

- **The motor error** indicates that the motor has been drawing too much current for too long. To remedy this, reduce the wire feed speed or the wire feeder torque load/duty cycle. Press Jog/Purge button to clear error.

ERR WFS

- **The wire feed speed error** indicates actual wire feed speed does not match wire feed speed command. Press Jog/Purge button to clear error.

ERR STRT

- **The start erro**r occurs if the user has the trigger held for more than two minutes without striking an arc, or if the user holds the trigger past the postflow phase in a timed weld. This error also occurs if the trigger is held when the feeder is powered up. The error may be cleared by releasing the trigger, and pressing the Jog/Purge button.

ERR STOP

- **The stop error** occurs as result of obstructions in the wire feed system or a faulty wire drive system. Check wire feed and wire drive systems. Press Jog/Purge button to clear error.

ERR FLOW

- **The flow error** indicates no gas flow to the gun. The error may be reset by reestablishing gas flow to the gun, and then pressing the Jog/Purge button.

ERR COOL

- **The cool error** indicates no coolant flow in water flow switch option. The error may be reset by reestablishing coolant flow to the gun, and then pressing the Jog/Purge button.

ERR FTP

- **The file transfer error** occurs if data does not transfer to the feeder correctly. Press Jog/Purge button to clear error, and transfer data to feeder again.

ERR GND

- **The ground current error** occurs if weld current is detected in the earth ground connection. May be caused by a conductor making contact with unit chassis. Check and repair feeder weld connections. Press Jog/Purge button to clear error.

ERR STUK

- **The stuck error** occurs if the welding wire sticks to the workpiece at the end of a weld. May be caused by poor weld conditions. The error may be cleared by cutting wire from workpiece, and pressing the Jog/Purge button.

ERR PSF

- **The primary power error** occurs if the primary power circuit inside the feeder is not functioning correctly. Check feeder connections. Press Jog/Purge button to clear error.

8-2. Diagnostics (Continued)

ERR TEMP	ERR LINE	ERR ARC	ERR POL	UNIT MEM	UIM MEM
Indicates a temperature error.	Indicates a line error.	Indicates an arc error.	Indicates a polarity error.	Indicates a memory CRC PCM error.	Indicates a memory CRC UIM error.
MOTR MEM	WELD WAIT	MOTR COM	PLS WAIT	OVER CRNT	LOW WFS
Indicates a memory CRC motor error.	Indicates a weld cycle wait error.	Indicates a motor communication error.	Indicates a UIM communication error.	Indicates an overcurrent error.	Indicates a low WFS command error.

ERR TEMP

- **The temperature error** indicates welding power source has overheated and shutdown. The error may be cleared by allowing unit to cool down, and pressing the Jog/Purge button.

ERR LINE

- **The line error** indicates input power is outside of unit operating range. Check and correct input power. Press Jog/Purge button to clear error.

ERR ARC

- **The arc error** indicates an arc outage occurred possibly from a wire feeder error or power source error. Check wire feeder and power source. Press Jog/Purge button to clear error.

ERR POL

- **The polarity error** indicates the polarity is different than the selected polarity. Check and correct weld cable connections. Press Jog/Purge button to clear error.

UNIT MEM

- **The unit memory error** indicates the PCM board lost memory data. Press Jog/Purge button to clear error.

UIM MEM

- **The uim memory erro**r indicates user interface board lost memory data. Press Jog/Purge button to clear error.

MOTR MEM

- **The motor memory erro**r indicates motor board lost memory data. Press Jog/Purge button to clear error.

WELD WAIT

- **The weld wait erro**r indicates unit was not ready for a weld sequence. Press Jog/Purge button to clear error.

MOTR COM

- **The motor common erro**r indicates motor board lost data communications. Press Jog/Purge button to clear error.

PLS WAIT

- **The uim common erro**r indicates user interface board lost data communications. Press Jog/Purge button to clear error.

OVER CRNT

- **The over current erro**r indicates welding power source primary current is too high. Check and correct input power. Press Jog/Purge button to clear error.

LOW WFS

- **The low wire feed speed erro**r indicates actual wire feed speed is lower than wire feed speed command. Check for obstructions in the wire feed system or a faulty wire drive system. Press Jog/Purge button to clear error.

SECTION 9 – ELECTRICAL DIAGRAM

⚠ WARNING

ELECTRIC SHOCK HAZARD

- Do not touch live electrical parts.
- Disconnect input power or stop engine before servicing.
- Do not operate with covers removed.
- Have only qualified persons install, use, or service this unit.

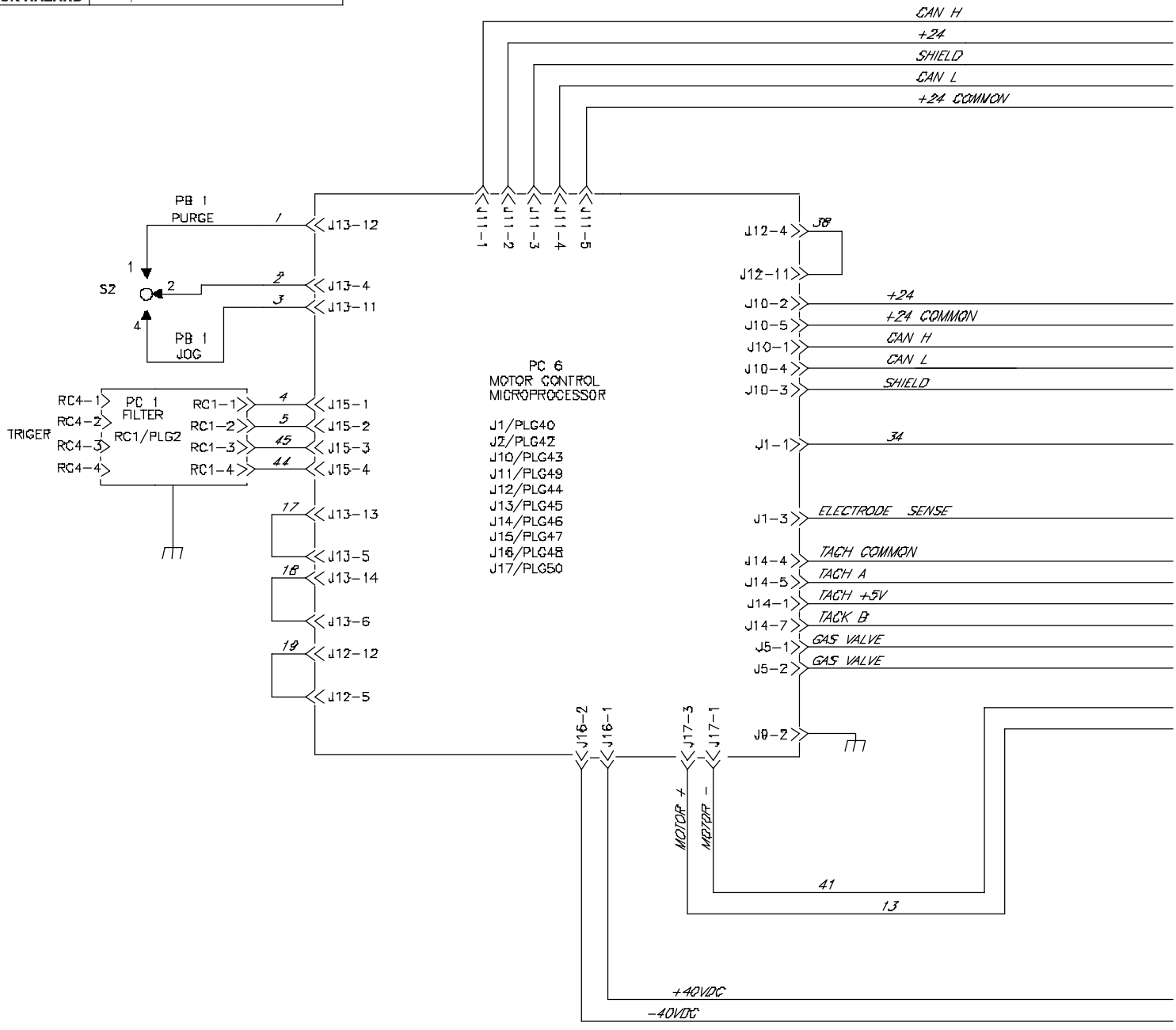
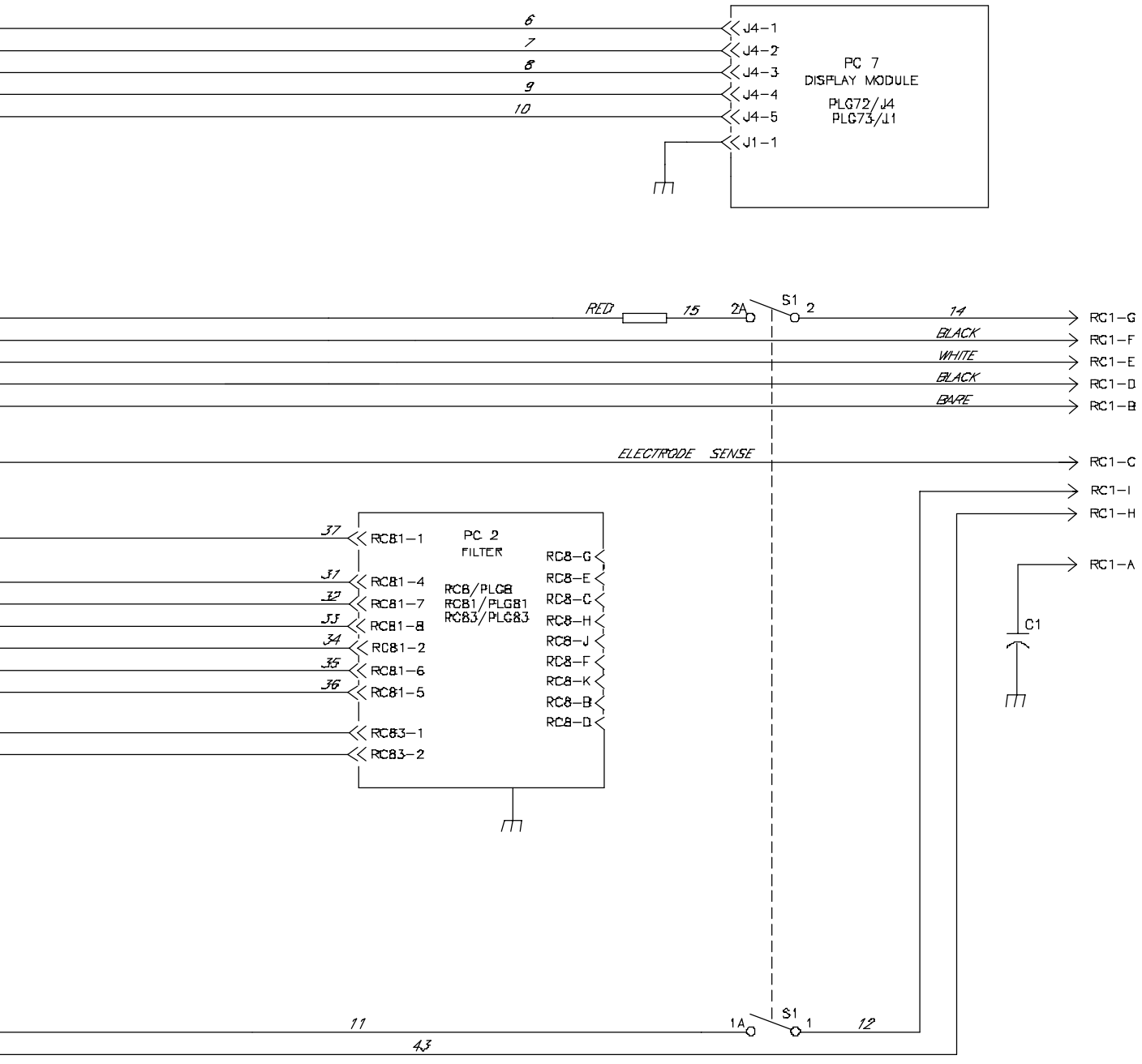


Figure 9-1. Circuit Diagram


6
7
8
9
10
J4-1
J4-2
J4-3
J4-4
J4-5
J1-1
PC 7
DISPLAY MODULE
PLG72/J4
PLG73/J1
RED
15
2A
S1
2
14
BLACK
WHITE
BLACK
BARE
RC1-G
RC1-F
RC1-E
RC1-D
RC1-B
ELECTRODE SENSE
RC1-C
RC1-I
RC1-H
RC1-A
C1
37
31
32
33
34
35
36
RC81-1
RC81-4
RC81-7
RC81-8
RC81-2
RC81-6
RC81-5
RC83-1
RC83-2
PC 2
FILTER
RC8/PLG8
RC81/PLG81
RC83/PLG83
RC8-G
RC8-E
RC8-C
RC8-H
RC8-J
RC8-F
RC8-K
RC8-B
RC8-D
11
43
1A
S1
1
12

214 842-B

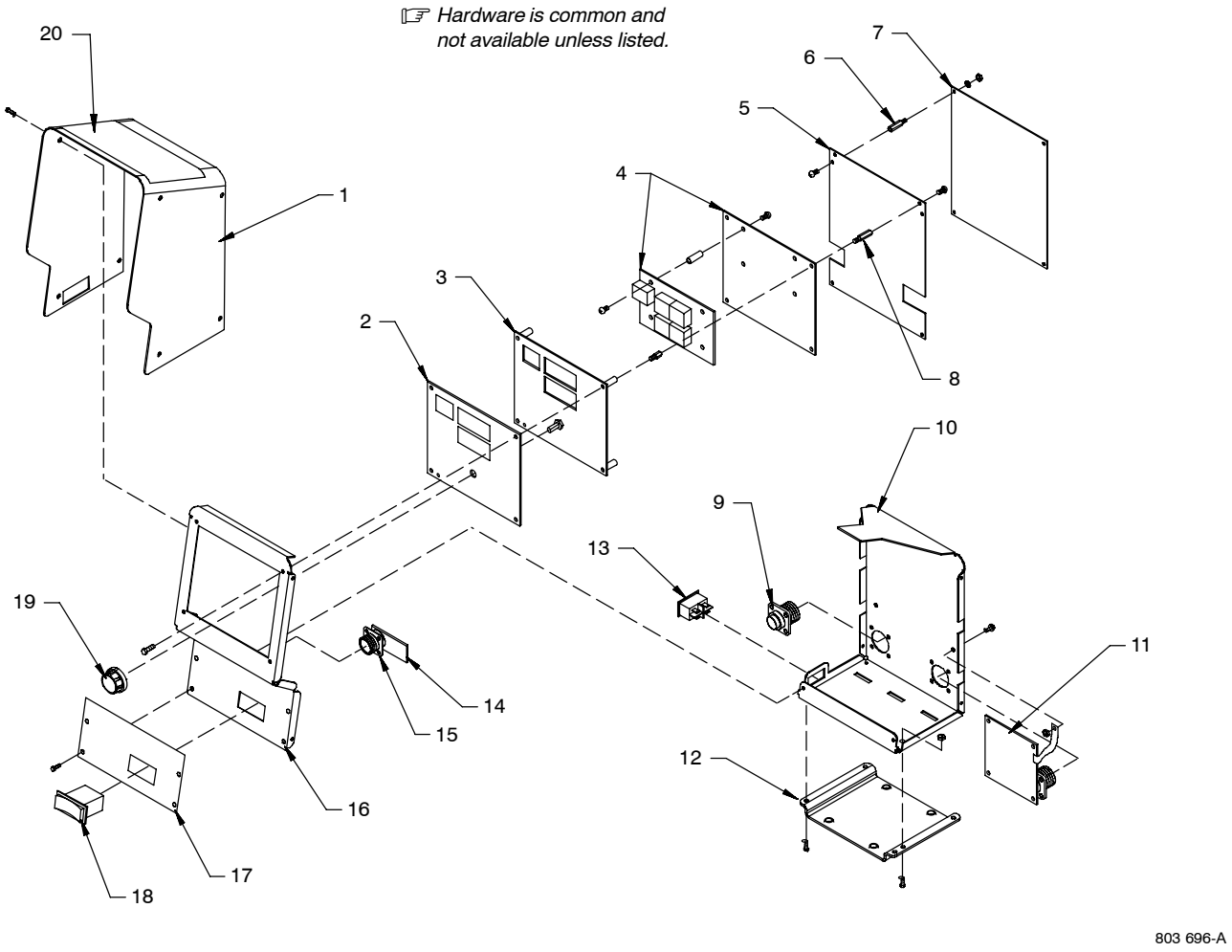


Figure 10-1. Remote Operator Interface

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
1		214 839	WRAPPER, feeder	1
		211 164	PANEL, pc card switch/overlay (including)	1
2		219 711	NAMEPLATE, overlay/CE	1
3		213 887	CIRCUIT CARD ASSY, switches	1
4	PC7	221278	USER INTERFACE MODULE	1
5		212 808	BAFFLE, pc mounting	1
6		207 676	STAND–OFF, no 6-32 x .250 lg .250 hex	4
7	PC6	221280	WIRE FEED MODULE	1
8		097 132	STAND–OFF SUPPORT, pc card	4
9	RC1	211 018	CONNECTOR, circ 97/met 9 pin size 20 rcpt	1
	PLG40,43,48	115 093	HOUSING PLUG+SKTS, (service kit)	1
10		211 002	ENCLOSURE, control	1
11	PC2	212 463	CIRCUIT CARD ASSY, motor filter	1
12		200 553	BRACKET, mtg control box	1
13	S1	213 632	SWITCH, rocker dpdt 10A 250VAC/20A 30VAC on-none-on	1

Item No.	Dia. Mkgs.	Part No.	Description	Quantity

Figure 10-1. Remote Operator Interface (Continued)

... 14	PC1	212 459	.. CIRCUIT CARD ASSY, trigger filter	1
... 15	RC4	048 282	.. RCPT W/SKTS, (service kit)	1
... 16		211 085	.. PANEL, front	1
... 17		217 809	.. NAMEPLATE	1
... 18	S2	210 998	.. SWITCH ASSY, jog/purge (including)	1
.....		200 295	.... SWITCH, rocker spdt 15A 12V (on)-off-(on)	1
.....		131 056	.... HOUSING PLUG+SKTS, (service kit)	1
.....		131 052	.... HOUSING PLUG+SKTS, (service kit)	1
... 19		179 851	.. KNOB, pointer 1.670 dia x .250 id push on w/spring	1
... 20		178 936	.. LABEL, warning general precautionary wordless CE WF	1
.....	PLG47	115 094	.. HOUSING PLUG+SKTS, (service kit)	1
.....	PLG48	202 592	.. HOUSING PLUG+SKTS, (service kit)	1
.....	PLG4	136 810	.. HOUSING PLUG+SKTS, (service kit)	1
.....	PLG81	115 092	.. HOUSING PLUG+SKTS, (service kit)	1
.....	PLG10	130 203	.. HOUSING PLUG+SKTS, (service kit)	1
.....	PLG50	136 810	.. HOUSING PLUG+SKTS, (service kit)	1
.....	PLG44	131 058	.. HOUSING PLUG+SKTS, (service kit)	1
.....	PLG45	188 352	.. HOUSING RCPT+SKTS, (service kit)	1
.....	PLG42	131 054	.. HOUSING RCPT+SKTS, (service kit)	1
.....	PLG40	201 665	.. HOUSING RCPT PLUG+SKTS, (service kit)	1
.....		149 251	.. CABLE, trigger 17 ft (including)	1
.....		080 328	.... CONNECTOR w/SOCKETS, free hanging	1
.....		079 531	.... CONNECTOR, circ clamp str rlf size 11 Amp 206358-2	2
.....		605 156	.... CABLE, port No18 4/C (order by ft)	17ft
.....		079 878	.... HOUSING PLUG & PINS, (service kit)	1

Notes

Notes

Notes

Warranty Questions?

Call
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Your distributor also gives you ...

Service
You always get the fast, reliable response you need. Most replacement parts can be in your hands in 24 hours.

Support
Need fast answers to the tough welding questions? Contact your distributor. The expertise of the distributor and Miller is there to help you, every step of the way.

Miller

TRUE BLUE® WARRANTY

Effective January 1, 2005
(Equipment with a serial number preface of "LF" or newer)

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Within the warranty periods listed below, Miller will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Miller must be notified in writing within thirty (30) days of such defect or failure, at which time Miller will provide instructions on the warranty claim procedures to be followed.

Miller shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the date that the equipment was delivered to the original retail purchaser, or one year after the equipment is sent to a North American distributor or eighteen months after the equipment is sent to an International distributor.

1. 5 Years Parts — 3 Years Labor
   * Original main power rectifiers
   * Inverters (input and output rectifiers only)
2. 3 Years — Parts and Labor
   * Transformer/Rectifier Power Sources
   * Plasma Arc Cutting Power Sources
   * Semi-Automatic and Automatic Wire Feeders
   * Inverter Power Sources (Unless Otherwise Stated)
   * Water Coolant Systems (Integrated)
   * Intellitig
   * Maxstar 150
   * Engine Driven Welding Generators **(NOTE: Engines are warranted separately by the engine manufacturer.)**
3. 1 Year — Parts and Labor Unless Specified
   * DS-2 Wire Feeder
   * Motor Driven Guns (w/exception of Spoolmate Spoolguns)
   * Process Controllers
   * Positioners and Controllers
   * Automatic Motion Devices
   * RFCS Foot Controls
   * Induction Heating Power Sources and Coolers
   * Water Coolant Systems (Non-Integrated)
   * Flowgauge and Flowmeter Regulators (No Labor)
   * HF Units
   * Grids
   * Maxstar 85, 140
   * Spot Welders
   * Load Banks
   * Arc Stud Power Sources & Arc Stud Guns
   * Racks
   * Running Gear/Trailers
   * Plasma Cutting Torches (except APT & SAF Models)
   * Field Options
     (NOTE: Field options are covered under True Blue® for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
4. 6 Months — Batteries
5. 90 Days — Parts
   * MIG Guns/TIG Torches
   * Induction Heating Coils and Blankets
   * APT & SAF Model Plasma Cutting Torches
   * Remote Controls
   * Accessory Kits
   * Replacement Parts (No labor)
   * Spoolmate Spoolguns
   * Canvas Covers

Miller's True Blue® Limited Warranty shall not apply to:

1. **Consumable components; such as contact tips, cutting nozzles, contactors, brushes, slip rings, relays or parts that fail due to normal wear. (Exception: brushes, slip rings, and relays are covered on Bobcat, Trailblazer, and Legend models.)**
2. Items furnished by Miller, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer's warranty, if any.
3. Equipment that has been modified by any party other than Miller, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

MILLER PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY COMMERCIAL/INDUSTRIAL USERS AND PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at Miller's option: (1) repair; or (2) replacement; or, where authorized in writing by Miller in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized Miller service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer's risk and expense. Miller's option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at a Miller authorized service facility as determined by Miller. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

TO THE EXTENT PERMITTED BY LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL MILLER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

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Owner's Record

Please complete and retain with your personal records.

Model Name	Serial/Style Number
Purchase Date	(Date which equipment was delivered to original customer.)
Distributor	
Address	
City	
State	Zip

For Service

Contact a DISTRIBUTOR or SERVICE AGENCY near you.

Always provide Model Name and Serial/Style Number.

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Contact the Delivering Carrier to:	File a claim for loss or damage during shipment. For assistance in filing or settling claims, contact your distributor and/or equipment manufacturer's Transportation Department.

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